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The impact of executive pay on the disclosure of alternative earnings per share figures

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ABSTRACT

This paper investigates the motives for disclosing an alternative earnings per share (EPS) figure. In particular, we extend prior findings for the UK (Choi, Lin, Walker & Young, 2007) by highlighting the role of managerial contracting in the alternative EPS disclosure choice. We examine a specific contractual setting where management is especially sensitive to reported earnings numbers, i.e., when EPS performance targets exist in the managerial remuneration package. Our analysis suggests that the choice to disclose an alternative EPS figure is positively related to firms where the vesting of executive share options (ESOs) is contingent on the achievement of growth in EPS. Our results remain significant after testing for selection bias, direction of causality and after matching firms on variables prior literature identifies as influential in the choice of an EPS target as a performance criterion in executive remuneration.

1. Introduction

Most UK listed firms make use of some form of vesting condition in executive compensation contracts that include share-based incentive components. In order for the majority of equity-based schemes to vest, the performance of the firm must satisfy one or more specific vesting conditions. Some compensation contracts make use of vesting conditions based on the firms' stock market performance while other contracts make use of vesting conditions based on accounting measures of performance such as earnings per share (EPS) growth, or both. We expect the existence and nature of these vesting conditions to affect firms' disclosure choices.

The motivation of this study is to explore the relation between the use of EPS performance based vesting targets in executive share option plans (ESOs) and the decision of whether or not to disclose an alternative EPS figure. Given that both EPS targets and alternative EPS figures use similar EPS definitions, that is, typically focus on permanent earnings excluding transitory items, we expect firms with EPS targets to disclose alternative EPS figures more often. We argue that this is consistent with the notion of shareholders attempting to measure and reward only the managerial effort that contributes towards the objective of long-term value maximization. Although the choice to disclose an alternative EPS figure is voluntary, the majority of our sampled firms chose to disclose an alternative EPS figure. This widespread use of alternative EPS figures supports the importance of enhancing our understanding regarding this disclosure choice.

A prior study finds that the disclosure of an alternative EPS (non-GAAP) figure in the UK is mainly motivated by management's desire to supplement basic EPS with a more informative alternative EPS figure (Choi, Lin, Walker, & Young, 2007). Choi et al. (2007) find that managers on average exclude transitory items when reporting non-GAAP earnings and this, they show, enhances market value. In this paper, we argue that contractual agreements, in particular those regarding remuneration, between management and shareholders also heighten the desire to disclose more informative accounting figures. Our study tests this conjecture.

The separation of ownership and control within a firm results in the need to monitor the actions of the managers (Jensen & Meckling, 1976). One of the objectives facing the designers of executive remuneration contracts is to do so in such a way as to ensure managers act to maximise the wealth of the shareholders. Shareholders are interested in the growth potential of firms and, under efficient contracting, will design executive compensation to motivate the executives to increase the long-term value of the firm. The performance target chosen by the majority of sampled UK firms in order for ESOs to vest is growth in EPS. Our cursory examination of annual reports indicates that remuneration committees, acting on behalf of the shareholders, set performance measures that capture managerial effort on what is of concern to shareholders,

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that is, permanent earnings. This typically means the exclusion of transitory items and intangibles (like goodwill amortisation) from the definition of the target EPS as these are neither under the direct control of management nor are they helpful in assessing the long-term potential of the firm (Gaver & Gaver, 1998; Doyle, Lundholm, & Soliman, 2003). Assuming that shareholders act efficiently in setting executive remuneration performance targets, as well as that the alternative EPS figure is a better indicator of managerial effort and more value relevant (see Choi et al., 2007), we expect a positive relation between EPS targets in ESOs and the disclosure of an alternative EPS figure.

Our analysis, based on a large sample of UK firms, supports the positive relation between the disclosure of an alternative EPS figure and the existence of EPS targets in ESOs. This positive relation is more pronounced in firms with high levels of intangible assets, which is consistent with the notion that shareholders use alternative EPS figures in firms where measuring managerial effort towards long-term value maximisation is difficult. Additional analyses confirm that the disclosure of an alternative EPS figure is mainly driven by the desire to provide more informative earnings figures. Our results are robust to a number of checks which address endogeneity, selection bias, and direction of causality.

Our work contributes to the disclosure and compensation literatures. First, we focus on a particular design feature of remuneration contracts which provides a unique opportunity to test the link between remuneration structure decisions and disclosure choices by firms. Second, we extend work on non-GAAP reporting by Walker & Louvari (2003) by examining a contracting motivation for the decision to disclose an alternative EPS figure.

The remainder of the paper is organised as follows. In the next Section, we present the literature review and hypothesis development; in Section 3 we present our research design; in Section 4 we present our results. Finally, we offer some discussion and conclusions in Section 5.

2. Prior literature and hypothesis development

2.1. Executive share-based compensation practice in the UK

Share-based compensation to executives continues to attract attention as a result of the high pay-outs and the perceived lack of a relationship between performance and pay. At first, the only share-based element of executive compensation plans were ESOs which traditionally had zero intrinsic value at the date of grant and had no performance conditions attached to their vesting. In the US, ESOs fell out of favour in the 1970s following a prolonged depression in the US stock market (Jensen & Murphy, 2004). In contrast, during the period 1992–98, Jensen & Murphy (2004) estimate that the annual dollar value of option awards to CEOs increased by more than 300%. Conyon, Core, & Guay (2011) find that the median UK CEO received more risk-adjusted pay than the median US CEO in 2003, a reversal of the 1997 situation.

As mentioned above, efficient compensation contracts should link pay to performance thus providing executives with incentives to maximise shareholder value. This does not necessarily imply the exclusive use of market-based performance measures to reward managers is an optimal choice. Instrumental in creating a strong link between pay and performance is the use and disclosure of any good quality performance measure that allows shareholders to better assess managerial effort and the long-term impact of this effort to firm value.

One might have expected share-based compensation, and in particular ESOs, to have broken the link between accounting-based measures of performance and performance-related pay. However, many firms use share-based compensation contracts that make explicit use of vesting criteria based on accounting performance. For example, most executive compensation contracts in our sample require specific EPS-based performance targets to be achieved in order for options to vest. This is the result of pressure from institutional investors, for example the Association of British Industries (ABI) guidelines, which among other things recommends the use of EPS growth targets (ABI, 1999). Therefore, the UK provides a unique setting for our study. In contrast, in the US most equity-linked compensation until recently lacked a predetermined performance hurdle (Balsam, Kuang, & Qin, 2011).

During our sample period, the majority of ESOs in our UK sample firms have 3-year EPS growth targets (defined generally as a percentage plus the Retail Price Index) which have to be met before any options vest. This is consistent with Pass (2006) who studied 51 constituent companies of the FTSE 100 for 1994–2003 and found:

> 'In all 38 out of the 45 companies currently operating options schemes target EPS, while 29 of the 36 companies currently using a LTIP target TSR' (Pass, 2006:301).

Long-term incentive plans (LTIPs) are restricted stock schemes, which have a zero exercise price. For our sample firms, we also find that LTIPs typically have TSR targets. Therefore, to address our research question we concentrate on ESOs.

While there is a lack of clarity in some annual reports on the actual definition of EPS used as the performance target in ESOs, generally firms appear to use a definition which would effectively be a non-GAAP EPS. Manifest Information Systems Ltd, a global proxy voting and corporate governance support service, corroborates our contention that earnings per share before exceptional items and amortisation of goodwill is 'probably most common in reality and often the one used when just "EPS" is stated' over the period of our study. In addition, evidence from annual reports also indicates that shareholders define the EPS performance target so it excludes transitory items and goodwill which is a better measure of future earnings and managerial effort. Typical examples of the conditions applicable to UK executive share option schemes are:

> Spectris plc, Report and Accounts 2003, 22:
>
> Exercise of share options…are subject to prior achievement of a performance condition, as approved by shareholders, requiring compound growth in earnings per share before exceptional items and amortisation of goodwill ("EPS") over three financial years of at least 2% per annum in excess of the increase in the retail price index.

> Shanks plc, Annual Report and Accounts 2003, 23:
>
> Options granted after 26 July 2001 will only be exercisable if the Group's earnings per share, before taking into account exceptional and extraordinary items and goodwill amortisation for the three-year measurement period, have increased by at least nine percentage points over the increase in the Retail Price Index for the same period.

2.2. The earnings per share financial reporting standard

For the sample period of this study the standard governing the disclosure of EPS in the UK is Financial Reporting Standard 3 (FRS 3), *Reporting Financial Performance*, issued by the Accounting Standards Board (ASB, 1992). FRS 3 requires only one basic EPS number to be included in published financial statements and importantly the precise definition of how this basic EPS figure is to be calculated is defined in FRS 3. Where a firm chooses to disclose an alternative EPS measure, the standard requires the chosen alternative to be calculated consistently over time and the standard also requires that the alternative figure should be reconciled to the FRS 3 EPS figure. In addition, any alternative EPS figure should be disclosed with an equal or lower level of prominence as the FRS 3 EPS figure. FRS 3 allows but does not require firms to disclose an alternative EPS figure (Walker & Louvari, 2003).

The investigation of the decision to disclose an alternative EPS figure is thus an interesting research question given the fact that management have control over whether or not an alternative EPS figure is disclosed in addition to having control over its definition.

There is an additional advantage of studying a sample period when UK GAAP was still the relevant accounting standard. Voulgaris, Stathopoulos, & Walker (2011) report that firms make less use of accounting-based performance measures in executive compensation, post-IFRS. Voulgaris et al. (2011) maintain that IFRS added "noise" to accounting numbers making reported earnings less useful for evaluating managerial performance. Therefore, our study is not affected by this exogenous change in accounting standards and its subsequent potential effect on firm accounting choices.

2.3. The accounting choice literature

Choi, Lin, Walker, & Young (2005) review the studies which have focused on understanding why some firms disclose non-GAAP earnings. There are two strands of thinking on non-GAAP earnings disclosures. The first strand indicates that such disclosures may be strategically motivated with management using such disclosures to divert attention away from poor underlying performance (Matsumoto, 2002; Burgstahler & Eames, 2003). The other strand reports that some managers appear to use non-GAAP earnings disclosures to supplement the informativeness of GAAP earnings. For example, Verrecchia (1983) demonstrates how better quality information available to managers can result in greater voluntary disclosure of non-proprietary information. The implication is that managers have incentives to disclose value-relevant non-proprietary information when it is of higher quality than publicly available information. Lougee & Marquardt (2004) concur and document that firms with less informative GAAP earnings are more likely to include non-GAAP earnings information in their quarterly earnings releases. Lougee & Marquardt (2004) interpret their results as evidence that voluntary non-GAAP earnings disclosures are motivated by management's desire to supplement uninformative GAAP earnings with more useful measures of sustainable periodic performance. In a study of disclosure practices in the UK, Choi et al. (2007) conclude:

> "Although some firms appear to use non-GAAP earnings disclosures to artificially boost reported performance, opportunism does not appear to characterize our data on average" (Choi et al., 2007: 618).

The components of earnings may be classified as recurring or transitory and investors appear to understand this distinction and apply a lower weight to transitory items (Bradshaw & Sloan, 2002). Choi et al. (2007) find that management-specific adjustments to GAAP earnings more likely reflect superior knowledge of the persistence of earnings components. In addition, analysts and compensation committees appear to largely exclude transitory expenses when determining actual earnings and compensation (Gaver & Gaver, 1998; Doyle et al., 2003). For their sample of UK firms, Choi et al. (2007) provide characteristics of earning components excluded by management from GAAP EPS. Firms disclosing non-GAAP EPS, in 2001, typically omit the following two items: 74.1% exclude amortization of goodwill and 22.3% exclude 'other specified exceptional items'. A further 9.4% exclude the 'impairment, diminution or write off of goodwill'.

The setting for this research is particularly useful as it provides a sample of firms where a component of executive compensation incorporates a relatively uniform performance target (growth in EPS). Additionally, we can determine whether or not an alternative EPS figure is disclosed thus allowing an opportunity to ask whether equity-based compensation provides managers with incentives to be more forthcoming with disclosure.

2.4. Hypothesis development

In an agency theory setting, which portrays the firm as a set of contractual relations among stakeholders, there is a significant role for accounting performance measures when such measures are incrementally informative with respect to management's actions or when their use encourages efficient risk-sharing between contracting parties (Gjesdal, 1981; Holmström, 1979; Lambert & Larcker, 1987; Sloan, 1993). The choice of a performance measure in executive compensation contracts depends on how informative it is about the manager's actions (Holmström, 1979; Lambert, 2001), since optimal theory suggests that managers should be rewarded for their actions (i.e. contribution towards the firm's output) and not the actual output (Lambert, 1983). Equity returns, like every performance measure, is a function of the manager's actions and an amount of "noise" which is out of the manager's control. The inclusion of an accounting-based measure helps mitigate the "noise" out of manager's control (Baker, 1987; Lambert & Larcker, 1987; Sloan, 1993). Thus, under efficient contracting one should expect shareholders to link executive compensation to an EPS figure which is more informative of managerial effort (alternative EPS) and then to push for the disclosure of this alternative EPS figure. As shareholders are interested in the long-term performance of the firm, we propose that they reward managers on the basis of core earnings and exclude transitory items when setting performance targets for compensation. This, we suggest explains our finding of a causal relation between the disclosure of an alternative EPS figure and the inclusion of an EPS target in ESOs.

Barber, Kang, & Kumar (1998) contend that this role of accounting is supported by evidence of strong contemporaneous correlations between accounting earnings and executive compensation (Lambert & Larcker, 1987; Jensen & Murphy, 1990). They observe that accounting earnings (in particular the persistence of those earnings) is used effectively and are relevant in setting executive compensation, namely, cash salary and bonus. While they exclude stock-based compensation components from this conclusion, stock-based compensation did not have accounting performance targets for their sample firms, in contrast to the case in our sample.

Also, Biddle & Choi (2006) examine different definitions of income across three applications; information content, predictive ability and executive compensation contracting. They conclude that for executive contracting, net income (alternative EPS), rather than comprehensive income (GAAP EPS) is most decision relevant, consistent with the view of managers and prior contracting research (Holthausen & Watts, 2001).

We argue that the disclosure of an alternative EPS figure has been shown in the literature (Lougee & Marquardt, 2004; Choi et al., 2007) to be for the most part efficient, particularly in the UK. Managers disclose an alternative EPS figure to provide a better indicator of sustainable earnings. Based on this evidence, we expect UK firms to behave in an efficient manner with respect to voluntary disclosures.[1]

While there is evidence suggesting managers behave opportunistically in response to the structure of their compensation, Nagar, Nanda, & Wysocki (2003) contemplate that shareholders may anticipate (and potentially desire) these managerial actions when designing compensation plans. This is so equity-based compensation will provide managers with incentives to be more forthcoming with disclosure. They examine the relation between voluntary disclosure policies and the portion of equity in CEO compensation. They provide evidence that the extent of voluntary disclosure is positively related to the level of CEO stock-based compensation and stockholding. Because voluntary disclosure of management private information increases transparency and reduces information asymmetry, Nagar et al. (2003) argue that their findings provide evidence that stock-based compensation improves the alignment between executives' and shareholders' interests.

[1] Managers could also act opportunistically and use the disclosure of an alternative EPS figure to present more favourable results and thus meet the required target for their ESOs to vest. But prior evidence in the UK is inconsistent with this view (Choi et al., 2007). In addition, as our sample includes a large cross-section the likelihood of the average firm engaging in opportunistic disclosure over consecutive years is lessened.

Kuang & Qin (2009) find that the use of performance-vested share options in executive remuneration contracts is associated with greater interest alignment. They argue that remuneration contracts based on performance measures with direct effort implications (84% of their sample firms have an EPS target) motivate managers to exert higher effort and increase firm performance, consistent with shareholders' interest. Young & Yang (2011) also find that share repurchase activity is positively related to the presence of EPS performance criteria in executive compensation. They present results which indicate share repurchases motivated by EPS targets in executive compensation suggest net benefits to shareholders.

Accepting the evidence above, we expect that firms that include an EPS performance criterion in their ESOs also disclose voluntarily an alternative EPS figure. This is the case since under efficient contracting the introduction of accounting-based vesting criteria in managerial compensation calls for informative accounting-based performance measures, if managerial pay is to be strongly linked to performance. In other words, given the availability of choices, a priori, it would be expected that the disclosure of an alternative EPS figure would be positively related to the existence of an EPS performance target in executive remuneration as both represent efficient contracting.

We propose the following hypothesis:

H1. The disclosure of an alternative EPS figure is positively related to the existence of an EPS target in executive share option plans.

3. Research design

3.1. Sample selection

The sample comprises the 500 largest London Stock Exchange-listed non-financial firms ranked by market capitalisation in 2001.[2] We track these firms and collect information also for 2002 and 2003. During this sample period the use of ESOs was widespread, and more dominant than LTIPs; hence, it provides a good opportunity to test the link between an EPS target and the disclosure of an alternative EPS. Details of alternative EPS disclosures along with remuneration data were hand-collected from firms' published financial statements. I/B/E/S-defined EPS was obtained directly from I/B/E/S. Financial statement, market data and industry classifications were collected from Datastream and the corporate governance data was supplied by Manifest Information Systems Ltd. All sectors are represented in the sample using Datastream Level 3 industry classifications. The industrial goods and services sector has the largest representation accounting for 28% of sample firms.

The final sample is reduced by firms missing I/B/E/S EPS, Datastream items and corporate governance data. In addition, the remuneration data reported by some firms is insufficient to determine the existence or otherwise of an EPS growth target in ESOs. The final sample consists of 960 firm-years.

3.2. Disclosure choice model: variable definitions and model specification

We build on Choi et al. (2005) who classify their variables into test, control and indicator variables which are defined below.

The test variables include *NEGIBES*, *NEGPOS* and *MAGDIFF*. *NEGIBES* equals 1 if I/B/E/S defined EPS (EPS^{IBES}) is negative and 0 otherwise. *NEGIBES* is expected to be negatively associated with the disclosure of alternative EPS on the assumption that management will be keen to avoid reporting a loss.

NEGPOS takes the value of 1 if FRS 3 EPS (EPS^{FRS3}) is negative and I/B/E/S-defined EPS (EPS^{IBES}) is positive and 0 otherwise. The probability that an alternative EPS figure is disclosed is predicted to be positively related to *NEGPOS*. Choi et al. (2005) suggest that under these circumstances, management face strong incentives to report I/B/E/S-defined EPS if this is deemed more informative regarding sustainable earnings.

MAGDIFF is a measure of the relative uninformativeness of EPS^{FRS3} with respect to sustainable earnings. Evidence indicates that EPS^{IBES} are informative about sustainable earnings (Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003). It is the measure of the price-scaled difference between EPS^{FRS3} and the corresponding EPS^{IBES} figure:

$$MAGDIFF = \left| EPS_{it}^{\ FRS3} - EPS_{it}^{\ IBES} \right| / P_{it} \quad (1)$$

Choi et al. (2005) cite evidence in Bradshaw & Sloan (2002) and Brown & Sivakumar (2003) to predict that the probability of management disclosing an alternative EPS figure will be positively related to *MAGDIFF*.

Choi et al. (2005) also include the following control variables, *SIZE*, *MTB*, *NANAL* and *PAGES* which they draw from prior disclosure literature. Lang & Lundholm (1993), Clarkson, Koa, & Richardson (1994), Iatridis (2008) and Iatridis (2011) among others have found a positive association between firm size and the amount of voluntary disclosure. *SIZE* is defined as the natural logarithm of fiscal year-end market capitalisation. The market-to-book (*MTB*) is the natural logarithm of the market-to-book ratio defined as the year-end share price per share divided by the book value of shareholders' funds per share and is included as prior research finds it influences firms' discretionary disclosure decisions (Chen, DeFond, & Park, 2002).

NANAL is the natural logarithm of the number of analysts from I/B/E/S following the firm at the year-end and controls for differences in the external information environment of firms (Lang & Lundholm, 1996; Bhushan, 1989; Chen et al., 2002). *PAGES* is the natural logarithm of the number of pages in the published financial statements and measures a firm's general attitude towards disclosure (Walker & Louvari, 2003).

In addition to the test and control variables above, Choi et al. (2005) add two indicator variables. The first is *MAGDIFFINC* representing the interaction between *MAGDIFF* and an indicator variable taking the value of 1 where EPS^{IBES} is positive and materially greater than EPS^{FRS3}, and 0 otherwise. The second is *MAGDIFFDEC* representing the interaction between *MAGDIFF* and an indicator variable taking the value of 1 where EPS^{IBES} is positive and materially less than EPS^{FRS3}, and 0 otherwise. Choi et al. (2005) argue that if alternative EPS disclosures are intended to counter the relative lack of informativeness of EPS^{FRS3} for sustainable earnings, then management should be as likely to disclose alternative EPS when sustainable earnings fall below EPS^{FRS3} by a large amount as they are when sustainable earnings exceed EPS^{FRS3} by a corresponding amount. If, on the other hand, alternative EPS disclosures are opportunistically motivated, the probability of disclosure is expected to fall when EPS^{FRS3} exceeds sustainable earnings by a large amount.

We create an additional independent exploratory variable, *TARGET* which is defined as 1 if the ESOs component of executive remuneration contains an EPS performance criterion and 0 otherwise. In line with the H1 above, *TARGET* is expected to be positively associated with the disclosure of an alternative EPS figure. Information on the existence of an ESO component of executive remuneration was hand-collected from financial statements along with whether or not the vesting of these ESOs depends on a growth in EPS performance criterion. For the purpose of this study, ESOs are defined as share option plans (schemes) which are open only to executives. All-employee share option plans and revenue approved share option plans are not considered. The reason for this is that the number of options allowed to be granted under the latter plans is restricted, and are therefore not expected to provide incentives to motivate executives to take actions to disclose an alternative EPS figure or to manage earnings. LTIPs, share plans where the exercise price is zero, are excluded regardless of whether or not a performance

[2] While mandatory disclosure of performance conditions in ESOs was only introduced for firms reporting on or after 31 December 2002, conditions for ESOs granted in or before 2001 were generally available in the 2002 remuneration reports.

condition is attached to their vesting. The performance condition attached to LTIPs in the majority of our sample firms was total shareholder return and not an EPS growth target.

Consistent with prior literature, logit regression analysis is used to analyse the impact on the disclosure of an alternative EPS figure of an EPS target in ESOs. Year and industry indicator variables are included in the model to control for year and industry effects. Eq. (2) includes the exploratory variable and the test, control and indicator variables.

$$Prob(NDISCL = 1) = F(\beta_0 + \beta_1 TARGET_{it} + \beta_2 NEGIBES_{it} + \beta_3 NEGPOS_{it} + \beta_4 SIZE_{it} + \beta_5 MTB_{it} + \beta_6 NANAL_{it} + \beta_7 PAGES_{it} + \beta_8 MAGDIFF_{it} + \beta_9 MAGDIFFINC_{it} + \beta_{10} MAGDIFFDEC_{it} + YEAR + INDUSRTRY + \varepsilon_{it}) \quad (2)$$

4. Results

4.1. Descriptive statistics

Panel A of Table 1 presents the relation between *NDISCL* and *TARGET*. 64% of firms disclose an alternative EPS figure and have an EPS target in their ESOs, as well. Panel B presents the descriptive statistics. The mean values of *NDISCL* (80%) and *TARGET* (75%) confirm that the majority of firms disclose an alternative EPS figure and have an EPS target in their ESOs. The average size of the firms is £359 million and the *MTB* of the firms is 0.72.

Table 2 presents the correlations between the variables. While there are significant correlations between some variables only three have values above 0.5. This is still lower than the 0.8 cut-off which is indicative of multicollinearity problems (Kennedy, 1992). So, we do not expect our models to suffer from multicollinearity problems. Subsequent Variance Inflation Factor (VIF) analyses also confirm this is the case.

4.2. Main regression analyses

Table 3 reports the Logit regression analysis explaining alternative EPS disclosure choice. As hypothesised the disclosure of an alternative EPS figure is positively related to the existence of an EPS target in ESOs (*TARGET*). The effect is economically significant. In particular, the *TARGET* coefficient is 0.584; given that we run a logistic regression this coefficient represents the log of odds of *TARGET* leading to an alternative EPS figure. If we transform it to a probability we find the probability that the existence of an EPS target will lead to the publication of an alternative EPS figure is 64%. So even after controlling for a range of other economic determinants of the EPS disclosure choice, we match the observations of our univariate tests (see Section 4.1).

Also, *NEGIBES* is significant and negatively related to disclosure in line with our prediction, on the basis that management will be eager to avoid reporting a loss. The sign of the coefficients on *NEGPOS* and *MAGDIFF* are positively related to the disclosure decision and support an attempt by management to report a figure which better informs about sustainable earnings. These findings support the evidence in Bradshaw & Sloan (2002) and Brown & Sivakumar (2003) that I/B/E/S-defined EPS is informative about sustainable earnings.

While *NEGPOS* is significant, *MAGDIFF* is not, indicating that the magnitude of the difference between EPS^{FRS3} and EPS^{IBES} is not a significant factor in the decision to disclose an alternative EPS figure.

Both *NANAL* and *PAGES* are significant in explaining the disclosure of an alternative EPS figure by the firms in our sample. While we were unable to predict the sign of the impact of these variables, *NANAL* has a negative impact on the disclosure choice, substantiating a desire by management to disclose an alternative (more informative EPS figure) when there is less availability of an informative EPS figure from I/B/E/S.

Both *MAGDIFFINC* and *MAGDIFFDEC* test if disclosure is to provide better information, and while the sign is not predicted, a significant association is expected. A significant relation is reported for *MAGDIFFINC* but not *MAGDIFFDEC*. The coefficient estimate for *MAGDIFFINC* (where EPS^{IBES} is both positive and materially greater than EPS^{FRS3}) is positive and significant (at the 1% level) suggesting disclosure probability is an increasing function of the disparity between EPS^{FRS3} and EPS^{IBES} only when EPS^{IBES} is materially greater than EPS^{FRS3}. The positive coefficient for *MAGDIFFDEC* supports the idea that disclosure probability is a function of the disparity between EPS^{FRS3} and EPS^{IBES} and that alternative EPS disclosure is intended to counter the relative lack of informativeness of EPS^{FRS3} for sustainable earnings. The fact that it is insignificant though weakens this argument.

Collectively, these results appear to confirm our conjecture that the decision to disclose an alternative EPS figure is mainly driven by the desire to provide more informative earnings figures.

Finally, the year indicator variables are positive and significant, indicating that the average level of alternative EPS disclosure increased during our sample period.

We run Model 1 with an additional interaction term (*TARGET* * *MAGDIFFINC*) on the basis that if an EPS target reflects efficient contracting then the interaction between *TARGET* and *MAGDIFFINC* should be negative (assuming the positive value on *MAGDIFFINC* indicates opportunism). The coefficient of the interaction term is negative

Table 1
Disclosure - target relation and descriptive statistics.

Panel A: Relation between disclosure of adjusted EPS figures and the presence of an EPS target in ESOs

$N = 960$	Firm Years	Frequency (%)
Disclosure and target	610	63.54
No disclosure and target	108	11.25
Disclosure and no target	156	16.25
No disclosure and no target	86	8.96
	960	100.00

Panel B: Descriptive statistics

Variable	N	Mean	St. dev	25th percentile	Median	75th percentile
NDISCL	960	0.798	0.402	1.000	1.000	1.000
TARGET	960	0.748	0.434	0.000	1.000	1.000
NEGIBES	960	0.138	0.345	0.000	0.000	0.000
NEGPOS	960	0.150	0.357	0.000	0.000	0.000
SIZE	960	12.792	1.530	11.731	12.631	13.768
MTB	960	0.720	0.844	0.154	0.653	1.145
NANAL	960	1.000	0.857	0.000	1.099	1.609
PAGES	960	4.172	0.321	3.989	4.159	4.331
MAGDIFF	960	0.095	0.216	0.006	0.019	0.066
MAGDIFFINC	960	1.076	2.131	0.000	0.000	1.301
MAGDIFFDEC	960	0.398	1.120	0.000	0.000	0.053
INTASSETS	960	0.201	0.206	0.031	0.133	0.303

Notes: Panel A of this table presents statistics on the bivariate relation between disclosure of an alternative EPS figure and the presence of an EPS target in ESOs. Panel B presents the descriptive statistics of the variables used in the Disclosure model ($N = 960$). *NDISCL* takes the value of 1 if firm *i* discloses an alternative EPS figure and 0 otherwise; *TARGET* is an indicator variable taking the value of 1 if the ESO plan component of executive remuneration contains an EPS performance criterion and 0 otherwise; *NEGIBES* is an indicator variable that takes the value of 1 if $EPS^{IBES} \leq 0$ and 0 otherwise; *NEGPOS* is an indicator variable that takes the value of 1 if $EPS^{FRS3} < 0$ and $EPS^{IBES} > 0$, and 0 otherwise; *SIZE* is the natural logarithm of fiscal year-end market capitalisation; *MTB* is the natural logarithm of the market-to-book ratio defined as the year-end share price per share divided by the book value of shareholders' funds per share; *NANAL* is the number of analysts (from I/B/E/S) following the firm at the end of year *t*; *PAGES* is the number of pages in the firm's published annual report and accounts; MAGDIFF is the absolute price-scaled difference between EPS^{IBES} and EPS^{FRS3}; *MAGDIFFINC* represents the interaction between *MAGDIFF* and an indicator variable taking the value of 1 when EPS^{IBES} is positive and materially greater than EPS^{FRS3}, and 0 otherwise; *MAGDIFFDEC* represents the interaction between *MAGDIFF* and an indicator variable taking the value of 1 when EPS^{IBES} is positive and materially less than EPS^{FRS3}, and 0 otherwise; *INTASSETS* is defined as intangible assets divided by total assets.

Table 2
Pearson correlations.

Disclosure choice model												
	NDISCL	*TARGET*	*NEGIBES*	*NEGPOS*	*SIZE*	*MTB*	*NANAL*	*PAGES*	*MAGDIFF*	*MAGDIFFINC*	*MAGDIFFDEC*	*INTASSETS*
NDISCL	1.000											
TARGET	0.222***	1.000										
NEGIBES	−0.289***	−0.325***	1.000									
NEGPOS	0.132***	0.029	−0.168***	1.000								
SIZE	0.132***	0.191***	−0.229***	−0.124***	1.000							
MTB	0.007	0.035	−0.012	−0.133***	0.288***	1.000						
NANAL	−0.001	0.092***	−0.135***	−0.109**	0.631***	0.050	1.000					
PAGES	0.157***	0.117***	−0.094***	0.013	0.581***	0.045	0.357***	1.000				
MAGDIFF	0.038	−0.080*	0.115***	0.532***	−0.279***	−0.262***	−0.147***	−0.005	1.000			
MAGDIFFINC	0.190***	0.103***	−0.202***	−0.212***	−0.004	−0.104***	−0.013	0.020	−0.099***	1.000		
MAGDIFFDEC	−0.026	−0.011	−0.142***	−0.150***	0.008	−0.032	0.036	−0.045	−0.017	−0.180***	1.000	
INTASSETS	0.184***	0.010	−0.006	0.154***	0.022	0.067**	−0.135***	0.102***	0.010***	0.136***	−0.143**	1.000

Notes: This table presents the Pearson correlations of the variables used in the Disclosure model ($N = 960$). ***, **, * denote significance at 1%, 5%, and 10%. All variables are defined as in Table 1.

but insignificant. As above for *MAGDIFFDEC*, while the result is insignificant, the sign is correct indicating that opportunism does not appear to prevail here (untabulated result).

Given the common exclusion of transitory items in both EPS targets and alternative EPS figures disclosed by firms, we expect those firms with higher intangible assets and an EPS target in executive compensation will be more likely to disclose an alternative EPS figure. We test this by running Model 1 for (a) firms with above median intangibles and (b) firms with below median intangibles. *INTASSETS* is defined as the ratio of intangible assets to total assets. The results are presented in columns 4 and 5 in Table 3, respectively. *TARGET* is positive and significant at the 1% level for firms with above median intangible assets and not significant for firms with below median intangible assets. This result is highly supportive of the argument that in firms with more intangibles, the existence of an EPS target in executive compensation leads to the disclosure of alternative EPS.

The results above provide evidence of a strong causal link between EPS performance targets in executive compensation and the disclosure of alternative EPS figures. We perform a number of robustness checks which address endogeneity, selection bias, and direction of causality and consider results after matching firms.

Table 3
Disclosure choice model explaining alternative EPS disclosure.

Variable	Predicted sign	Coefficient	Above median Intangibles coefficient	Below median Intangibles coefficient
Intercept	?	−7.106***	−7.457***	−5.758***
		(0.000)	(0.008)	(0.005)
TARGET	+	0.584***	1.243***	0.160
		(0.003)	(0.000)	(0.552)
NEGIBES	−	−0.952***	−0.951*	−1.336***
		(0.001)	(0.053)	(0.002)
NEGPOS	+	1.319***	0.731	1.642***
		(0.001)	(0.280)	(0.005)
SIZE	+	0.254**	0.322*	0.179
		(0.012)	(0.096)	(0.146)
MTB	?	0.088	−0.268	0.127
		(0.445)	(0.130)	(0.416)
NANAL	?	−0.449***	−0.421	−0.286
		(0.004)	(0.261)	(0.127)
PAGES	?	0.972***	0.866	0.836*
		(0.008)	(0.184)	(0.083)
MAGDIFF	+	0.362	0.088	0.297
		(0.482)	(0.905)	(0.764)
MAGDIFFINC	?	0.535***	0.634***	0.409*
		(0.004)	(0.008)	(0.057)
MAGDIFFDEC	?	0.032	0.031	0.051
		(0.711)	(0.840)	(0.611)
YEAR2002	?	0.842***	1.043**	0.844***
		(0.000)	(0.015)	(0.002)
YEAR2003	?	0.891***	0.992**	0.823***
		(0.000)	(0.031)	(0.003)
INDUSTRY DUMMIES		YES	YES	YES
LOG LIKELIHOOD		−387.349	−119.732	−242.916
CHI-SQUARE		132.310	68.690	63.110
P-VALUE		0.000	0.000	0.000
OBSERVATIONS		960	480	480

Notes: This table presents the logit regression results explaining alternative EPS disclosure. Year (*YEAR2002* and *YEAR2003*) and Industry dummies are included in all specifications. Robust standard errors are estimated. The *p*-values are reported in parentheses. ***, **, * denote significance at 1%, 5%, and 10%. All other variables are defined as in Table 1.

4.3. Endogeneity concerns—contract choice model

This study aims to expand our understanding on the alternative EPS disclosure choice by showing that the structure of executive remuneration contacts can affect this choice. Accordingly, H1 is designed to test whether an EPS-based performance criterion in executive remuneration is an explanatory factor in the decision to disclose an alternative EPS figure. If the disclosure choice of firms with an EPS target differs from those with no EPS target, this will raise the question of why some firms choose an EPS target as the performance criterion. It is possible that the remuneration structure and disclosure choice are endogenous and jointly determined. This means that we need to control for the endogeneity of contract choice and do so by modelling the choice to include an EPS target in ESOs. So as a first step, in this Section we model the EPS target contract choice. In the next Section, we explicitly control for selection bias using a recursive bivariate model.

We draw on the limited available literature and construct a model to explain the decision by a firm to include an EPS target in its executive remuneration contract.

Our hypothesis on the disclosure of an alternative EPS figure is based on the assumption that, on average, disclosure represents efficient contracting in agreement with Kuang & Qin (2009), Huang, Marquardt, & Zhang (2010), and Young & Yang (2011) who report the impact of an EPS target as being consistent with efficient contracting. A positive relation between EPS targets and the disclosure of alternative EPS figures would be consistent with the idea of management disclosing more informative earnings figures, i.e., strengthening the pay-performance link.

Huang et al. (2010) model the use of EPS as a performance measure in executive bonus plans and illustrate that the choice of an EPS target can be explained by economic determinants. Following Huang et al. (2010) and Dey (2008), we proxy for agency conflicts using firm size (*SIZE*), complexity (*COMPLEX*), free cash flow (*FCF*), growth (*MTB*) and ownership structure (*MGRSHARES*). In addition, we include *NOISE*, *INTASSETS*, *ETR*, *REGULATION*, *EXONBOARD*, *BRDSIZE* and *CEOCHAIR*. *NOISE* is defined as the ratio of time-series variance of ΔEPS to time-series variance of share returns over a five year period ending in the year of interest. According to agency theory, EPS targets are less likely

to be used the more noisy earnings is as a measure of managerial performance (Lambert & Larcker, 1987). Therefore, we expect a negative relation with the likelihood of using EPS as a performance measure. We expect *INTASSETS* to be negatively associated with the use of EPS in ESOs as Francis & Smith (1995) find that incentive contracts are not effective in reducing the high agency costs of incentive activity. The effective tax rate (*ETR*) is included as a proxy for agency conflicts as Klassen (1997) finds that firms with high agency costs tend to be less concerned with tax reporting than financial reporting.

REGULATION is defined as 1 if the firm operates in the telecom or utility industries as an inverse proxy for agency costs as the regulator will provide monitoring to reduce potential conflicts between managers and outside shareholders. We expect a negative association between *REGULATION* and *TARGET*. Year and industry indicator variables are included in the model to control for year and industry effects. We run our contract choice model with and without corporate governance variables. Eq. (3) is our contract choice model.

$$\begin{aligned} Prob(TARGET = 1) = F(&\beta_0 + \beta_1 SIZE_{it} + \beta_2 COMPLEX_{it} + \beta_3 FCF_{it} \\ &+ \beta_4 MTB_{it} + \beta_5 ETR_{it} + \beta_6 NOISE_{it} + \beta_7 INTASSETS_{it} \\ &+ \beta_8 REGULATION_{it} + \beta_9 MGRSHARES_{it} \\ &+ \beta_{10} EXONBOARD_{it} + \beta_{11} BRDSIZE_{it} \\ &+ \beta_{12} CEOCHAIR_{it} + YEAR + INDUSTRY + \varepsilon_{it}) \end{aligned} \quad (3)$$

In Table 4 column 3 which reports the results from Eq. (3) without the corporate governance variables we see that *SIZE*, *ETR*, *NOISE* and *REGULATION* are significant in determining if a firm includes an EPS target in its ESOs. The coefficients of both *SIZE* and *ETR* are positive, whereas the coefficients of *NOISE* and *REGULATION* are negative; all are consistent with our predictions. While *COMPLEX*, *FCF* and *MTB* are not significant their signs are as predicted. As expected, we report a negative and significant relation between *REGULATION* and *TARGET*.

Table 4
Contract choice model explaining EPS performance target in ESOs.

Variable	Predicted sign	Coefficient	Coefficient	Marginal effect
Intercept	?	−3.158***	−3.745***	
		(0.003)	(0.001)	
SIZE	+	0.228***	0.163*	0.029
		(0.002)	(0.064)	
COMPLEX	+	0.103	0.116*	0.020
		(0.103)	(0.078)	
FCF	+	0.002	0.002	0.000
		(0.160)	(0.140)	
MTB	−	−0.117	−0.112	−0.020
		(0.303)	(0.351)	
ETR	+	1.282***	1.246***	0.219
		(0.001)	(0.001)	
NOISE	−	−33.067**	−31.011**	−5.447
		(0.020)	(0.034)	
INTASSETS	−	0.251	0.112	0.020
		(0.602)	(0.817)	
REGULATION	−	−1.216***	−1.188***	−0.200
		(0.004)	(0.006)	
MGRSHARES	−		0.710	0.125
			(0.197)	
EXONBOARD	−		1.269*	0.223
			(0.093)	
BRDSIZE	?		0.096*	0.017
			(0.064)	
CEOCHAIR	−		−0.257	−0.048
			(0.421)	
YEAR2002	?	0.138	0.166	0.029
		(0.533)	(0.458)	
YEAR2003	?	0.349*	0.392	0.067
		(0.104)	(0.070)	
INDUSTRY DUMMIES		YES	YES	
LOG LIKELIHOOD		−408.912	−404.147	
CHI-SQUARE		70.270	83.400	
P-VALUE		0.000	0.000	
OBSERVATIONS		793	793	

Notes: This table presents the logit regression results on the determinants of an EPS target in ESOs. Year (*YEAR2002* and *YEAR2003*) and Industry dummies are included in both specifications. Robust standard errors are estimated. The *p*-values are reported in parentheses ***, **, * denote significance at 1%, 5%, and 10%. All other variables are defined as in Table 1.

We also consider corporate governance variables as the results for these variables will shed further evidence on whether the inclusion of an EPS target represents efficient contracting or managerial power. If weak corporate governance features result in an inefficient design of executive compensation contracts, good corporate governance structures should lead to superior compensation contracts and thus better advance shareholders' interest (Jensen, Murphy, & Wruck, 2004; Bebchuk, Fried, & Walker, 2002; Bebchuk & Fried, 2004). Thus, if efficient contracting is behind the inclusion of an EPS target, then we would expect a negative and significant relation between our proxies of managerial power and the inclusion of an EPS target in executive compensation contracts.

We run Eq. (3) with four corporate governance variables, which are *MGRSHARES*, *EXONBOARD*, *BRDSIZE* and *CEOCHAIR*. Huang et al. (2010) expect EPS to be especially useful when there is a greater degree of separation of ownership and control and greater levels of asymmetry between managers and shareholders. *MGRSHARES* and *CEOCHAIR* are proxies for managerial power (Bebchuk et al., 2002) and this would lead us to predict that if managerial power is evident, these variables would be positive and significantly related to whether or not a performance measure is included in share-based compensation.

Column 4 in Table 4 presents the results from the contract choice model above with the corporate governance variables. *MGRSHARES* and *CEOCHAIR* are our proxies for managerial power and we find these to be insignificant. As predicted, *CEOCHAIR* is negatively associated with the use of an EPS target, which we interpret as strengthening our contention that efficient contracting is behind the choice to include an EPS target in ESOs.

We note that agency theory predicts that the more noise a performance measure contains, the less weight firms will place on that measure in executive remuneration contracts (Banker & Datar, 1989). Therefore, under optimal contracting theory, *NOISE* is expected to be negatively associated with the use of an EPS target as the noisier the measure, the less likely we expect it to be chosen as a performance measure. The highly significant and negative result from *NOISE* (in both models) provides strong support for our efficient contracting premise. The estimated marginal effect of *NOISE* is −5.447. This implies that an increase in *NOISE* of one standard deviation will decrease the probability of the ESOs in a firm having an EPS target by 544.7%.

Overall, the results in Table 4 provide an indirect indication that efficient contracting is driving the decision to include an EPS target in ESOs and supports the conclusion that an EPS target in ESOs is in line with optimal contracting theory.

4.4. A selection model

To address potential selection bias in *NDISCL* we report in Table 5 recursive bivariate model estimates. As shown above, a firm with an EPS target in its ESOs is more likely to disclose an alternative EPS figure leading to potential selection bias problems in our main analysis. Given that the dependent variables of interest, that is, *NDISCL* and *TARGET*, are bivariate ones, we use a recursive bivariate probit model to control for this effect (Greene, 1998). This technique leads to more efficient estimates compared to a Heckman model, when modelling bivariate dependent variables. Column 3 reports the selection model where the exogenous instrument *BIG4*, an indicator variable which takes the value of 1 if the firm is audited by a BIG4 auditing firm and 0 otherwise, is added to the disclosure choice model in Eq. (2). Selection bias arises if the unobservable characteristics of the firms who disclose an alternative EPS are different from firms who do not disclose an alternative

Table 5
Bivariate probit model of an EPS target in ESOs on the disclosure of alternative EPS.

Variable	Predicted sign	Selection coefficient	Outcome coefficient
Itetercept	?	0.154	−2.177***
		(0.860)	(0.005)
TARGET	+		1.753***
			(0.000)
NEGIBES	−	−0.839***	0.033
		(0.000)	(0.884)
NEGPOS	+	0.180	0.324
		(0.374)	(0.998)
SIZE	?	0.165***	0.031
		(0.005)	(0.614)
MTB	?	−0.002	0.101
		(0.983)	(0.157)
NANAL	?	0.025	−0.161*
		(0.764)	(0.068)
PAGES	?	−0.417*	0.283
		(0.075)	(0.188)
MAGDIFF	+	−0.204	0.487
		(0.517)	(0.121)
MAGDIFFINC	?	0.076**	0.141**
		(0.019)	(0.023)
MAGDIFFDEC	?	−0.004	−0.004
		(0.934)	(0.817)
BIG4	?	0.249	–
		(0.169)	–
Rho	?		−0.792
CHI-SQUARE			359.830
P-VALUE			0.000
OBSERVATIONS			768

Notes: This table presents recursive bivariate probit model results on the EPS target and NDISCL relation. Column 3 presents the selection model where the exogenous instrument is *BIG4* which takes the value of 1 if a firm is audited by a BIG4 firm and 0 otherwise. Robust standard errors are estimated. The *p*-values are reported in parentheses. ***, **, * denote significance at 1%, 5%, and 10%. All other variables are defined as in Table 1.

EPS figure. In our sample, we have missing values for *NDISCL* and this is the result of FRS 3 which allows but does not require firms to disclose an alternative EPS figure (Walker & Louvari, 2003). Just over 13% of the original firms have a missing value for *NDISCL*. The recursive bivariate model procedure provides an estimate of whether the causal effects of having an EPS target accounts for unobservable factors causing bias and also for the heterogeneity in individual firm responses to an EPS target in their ESOs. Column 4 in Table 5 presents the results from the outcome model and importantly *TARGET* remains positive and significant.[3]

Furthermore, the evidence presented in Table 5 indicates that selection bias is unlikely to be the cause of our significant findings. The model fits the data well, chi2 = 359.82 and $p < 0.000$.

4.5. Direction of causality

Our premise is that the alternative EPS disclosure choice is better understood if we show that the type of managerial reward contracts affects this choice. One area of concern is the direction of causality between our main variables of interest, that is, *NDISCL* and *TARGET*. In particular, one could argue that the disclosure of an alternative EPS figure could drive the decision to include EPS targets in managerial compensation, if for example the disclosure choice is an indication of more informative earnings. We test this in Table 6 which includes two specifications, Column 3 has *NDISCL* as the dependent variable and we draw independent variables from the disclosure choice model in Eq. (2). Column 4 has *TARGET* as the dependent variable and the independent variables are from the contract choice model in Eq. (3). To address the direction of causality between *NDISCL* and *TARGET*, we estimate a system of simultaneous equations using three-stage least squares (3SLS).[4] The results show that the direction of causality could run both ways, but more importantly, when we control for reverse causality, the effect of *TARGET* on *NDISCL* remains significant.

[3] The results hold even when we run a Heckman model.

Table 6
Simultaneous equations (3SLS): NDISCL and TARGET.

Variable	Predicted Sign	Coefficient	Coefficient
Dependent variable		NDISCL	TARGET
TARGET	+	0.370**	
		(0.041)	
NDISCL	+		0.808***
			(0.000)
SIZE	?	0.018	0.020
		(0.248)	(0.152)
MTB	?	0.009	−0.023
		(0.627)	(0.329)
NEGIBES	−	−0.218***	
		(0.004)	
NEGPOS	+	0.060*	
		(0.089)	
NANAL	?	−0.033**	
		(0.020)	
PAGES	?	0.037	
		(0.026)	
MAGDIFF	+	0.037	
		(0.449)	
MAGDIFFINC	?	0.015***	
		(0.002)	
MAGDIFFDEC	?	−0.002	
		(0.778)	
COMPLEX	+		0.014*
			(0.062)
FCF	+		0.000
			(0.661)
ETR	+		0.066
			(0.192)
NOISE	−		−6.752**
			(0.014)
INTASSETS	−		0.056
			(0.391)
REGULATION	−		−0.156**
			(0.015)
YEAR DUMMIES		Yes	
INDUSTRY DUMMIES		Yes	Yes
OBSERVATIONS		726	726

Notes: This table presents simultaneous regressions of *NDISCL* and TARGET. In Panel A, the dependent variable is *NDISCL*. In Panel B, the dependent variable is *TARGET*. Intercepts not reported. The *p*-values are reported in parentheses ***, **, * denote significance at 1%, 5%, and 10%. All variables are defined as in Table 1.

4.6. Propensity score matching

The problems of model sensitivity, lack of robustness, linear functional form assumptions and the need for adequate counterfactuals motivate the use of matching methods (Clatworthy, Makepeace, & Peel, 2009). Matching is based on obtaining a credible counterfactual; would firms have disclosed an alternative EPS figure if they did not have an EPS target in their ESOs? In our analysis, firms with an EPS target in their ESOs are matched to firms without an EPS target in their ESOs on the basis of the predicted probability of having an EPS target, i.e., the contract choice model in Eq. (3).

Table 7 presents the propensity score (PS) matching results based on the contract choice model in Eq. (3) which includes independent variables drawn from the extant literature explaining the decision by

[4] We should add the caveat here that the 3SLS model is best suited for continuous, non-binary, dependent variables. Still, we are not aware of a more suitable technique to address the issue of the direction of causality. We note that the recursive bivariate technique addresses only selection bias problems and not direction of causality ones.

Table 7
Propensity score matching results for alternative EPS disclosure and an EPS target in ESOs.

Variables	Target	No target	% Bias reduction
SIZE†			
Unmatched	12.870	12.320	
Matched	12.773	12.801	94.9
COMPLEX†			
Unmatched	3.412	2.995	
Matched	3.345	3.370	94.0
FCF†			
Unmatched	44.240	8.379	
Matched	33.519	45.469	66.7
MTB			
Unmatched	0.712	0.629	
Matched	0.706	0.675	64.0
ETR†			
Unmatched	0.265	0.167	
Matched	0.262	0.251	89.4
NOISE†			
Unmatched	0.001	0.003	
Matched	0.001	0.001	98.0
INTASSETS			
Unmatched	0.202	0.177	
Matched	0.201	0.203	88.4
REGULATION†			
Unmatched	0.027	0.090	
Matched	0.028	0.021	89.7
MGRSHARES			
Unmatched	0.076	0.076	
Matched	0.078	0.066	−5847.8
EXONBOARD			
Unmatched	0.477	0.461	
Matched	0.480	0.461	−23.4
BRDSIZE†			
Unmatched	8.545	7.713	
Matched	8.399	8.141	69.0
CEOCHAIR			
Unmatched	0.076	0.096	
Matched	0.077	0.074	84.6
YEAR2003			
Unmatched	0.379	0.324	
Matched	0.367	0.367	99.4
OBSERVATIONS			753
*ATT*Δ			2.090**
ABS after matching			4.431

Notes: This table presents the means of the covariates between the treated firms (*TARGET* = 1) and the control firms (*TARGET* = 0), in columns 2 and 3 respectively, for the propensity score matching model. Column 4 presents the % Bias reduction after matching for each of the covariates. The balancing property is satisfied. †Means of treated and untreated unmatched are significantly different. Δ*ATT* is significant at the 5% level using bootstrap standard errors. All variables are defined as in Table 1.

firms to include an EPS target in executive compensation. The model of Eq. (3) does not meet the balancing property required for PS matching; the variable *YEAR2002* is not balanced and therefore the results presented here omit *YEAR2002*. The PS matching results are robust to various versions of the model which meet the balancing property requirement, for example excluding (1) *YEAR2002* and (2) *MGRSHARES*. It is important to note that the results are robust to the exclusion of *MGRSHARES* given the % Bias reduction (−5847.8) this variable reports in Table 7. The absolute bias reduction (ABS) after matching is below the benchmark of 5.

Table 8
Summary of robustness test for propensity score matching results applying different matching algorithms.

Matching algorithm	$N = 753$	Treated	Controls	Difference	S.E.	*t*-stat
Radius	ATT	0.865	0.764	0.102	0.013	2.09**
NN (1)	ATT	0.865	0.760	0.105	0.058	1.97*
NN (3)	ATT	0.865	0.756	0.110	0.013	2.20**
NN (5)	ATT	0.865	0.761	0.104	0.049	2.13**
Kernel	ATT	0.866	0.757	0.109	0.046	2.39***

Notes: This table presents the ATT results for the propensity score model after applying different matching algorithms. Each matching algorithm imposes common support and a calliper of (.01). The standard errors are calculated using bootstrapping because it accounts for the fact that the propensity score is estimated. ***, **, * denote significance at 1%, 5%, and 10%.

Matching methods are not robust to "hidden bias" arising from the existence of unobserved variables that simultaneously affect assignment to treatment and the outcome variable (*NDISCL*). Rosenbaum (2002) bounds analysis allows determination of how strongly an unmeasured confounding variable must affect selection into treatment in order to undermine the implications of a matching analysis. The results from Rosenbaum bounds analysis provide further evidence that an EPS target does increase the probability of the disclosure of an alternative EPS figure.

We use various matching algorithms to test if *NDISCL* remains significant after matching and the results, which we present in Table 8, indicate that our results are robust to all different matching algorithms used.[5] Table 8 presents the Average Treatment Effect on the Treated (ATT) for the various algorithms along with their significance level. We implement every matching algorithm with a calliper which represents the maximum (absolute) difference of the propensity score allowed for matching. In addition, we impose a common support, which means the test is performed only on observations that had propensity scores within the common region support. Heckman, Ichimura, & Todd (1997) and Becker & Ichino (2002) argue that imposing the common support restriction in the estimation of propensity scores improves the quality of the estimates. Overall, the matching tests conducted in this section highlight that the relation between EPS targets and the disclosure of alternative EPS figures is not driven by confounding effects and is robust to different specifications and assumptions.

5. Discussion and conclusions

We apply several alternative research designs in an effort to explore the relation between the disclosure of an alternative EPS figure and the existence of an EPS target in ESOs for UK firms for 2001–2003. We find the existence of an EPS target in ESOs is significantly and positively related to the decision to disclose an alternative EPS figure and this finding is robust.

Our study contributes to the existing literature by helping us understand the alternative EPS disclosure choice better. In particular, we show that the structure of executive remuneration has an impact on this choice. We believe the contribution of this paper is significant, given the widespread use of alternative EPS figures in the UK, as well as the intense academic interest in identifying the determinants of this accounting choice. Our results indicate that future researchers should control for governance characteristics, in particular managerial pay arrangements, when examining alternative EPS disclosure choices.

We address concerns about the endogeneity of contract choice; we include a model of contract choice and the variables used in this model are used as covariates in PS matching and show that the results are robust to the characteristics that might leave a firm disposed to including an EPS target. We also address selection bias (recursive

[5] See Smith & Todd (2005) and Imbens (2004) for technical details on the various matching algorithms.

bivariate probit model) and direction of causality (3SLS). Our results are robust to all of these tests.

This research is based on the period prior to the implementation of IFRS in the UK which began in 2004. Given the prevalence of EPS targets during this period, it provides a valuable setting to consider the link between executive compensation and a voluntary disclosure choice by firms. There is scope for new work on how the implementation of IFRS has influenced the disclosure of alternative EPS figures in the UK and in other EU countries. Recent calls in the UK for increased transparency regarding all aspects of UK managerial compensation arrangements may also give rise to further research opportunities. In addition, it would be interesting to study the relation between the structure of executive remuneration and the disclosure of an alternative EPS figure given the recent trend to replace ESOs with LTIPs.

References

Accounting Standards Board (1992). *Financial Reporting Standard No. 3: Reporting Financial Performance.* London: ASB.

Association of British Insurers (1999). *Share-based Incentive Schemes—Guideline Principles.* Interpretation and Application in the Context of Currently Evolving Practice. London: ABI.

Baker, G. P. (1987). Incentive contracts and performance measurement. *Journal of Political Economy*, *100*(3), 598–614.

Balsam, S., Kuang, Y. F., & Qin, B. (2011). *Executive Compensation Practices in the U.K. A Guide to Governance, Taxation & Accounting. Scottsdale, AZ: World at Work Press.*

Banker, R. D., & Datar, S. M. (1989). Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research*, *27*(1), 21–39.

Barber, W. R., Kang, S. H., & Kumar, K. R. (1998). Accounting earnings and executive compensation: The role of earnings persistence. *Journal of Accounting and Economics*, *25*(2), 169–193.

Bebchuk, L. A., & Fried, J. M. (2004). *Pay without Performance: The Unfulfilled Promise of Executive Compensation.* Cambridge: Harvard University Press.

Bebchuk, L. A., Fried, J. M., & Walker, D. I. (2002). Managerial Power and Rent Extraction in the Design of Executive Compensation. *University of Chicago Law Review*, *69*(3), 751–846.

Becker, S. O., & Ichino, A. (2002). Estimation of average treatment effects based on propensity scores. *The Stata Journal*, *2*(4), 358–377.

Bhushan, R. (1989). Firm characteristics and analyst following. *Journal of Accounting and Economics*, *11*(2–3), 255–274.

Biddle, G. C., & Choi, J. (2006). Is comprehensive income useful? *Journal of Contemporary Accounting and Economics*, *2*(1), 1–32.

Bradshaw, M., & Sloan, R. (2002). GAAP versus The Street: An empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research*, *40*(1), 41–66.

Brown, L., & Sivakumar, K. (2003). Comparing the value relevance of two operating income measures. *Review of Accounting Studies*, *8*(4), 561–572.

Burgstahler, D. C., & Eames, M. J. (2003). Earnings Management to Avoid Earnings Losses and Decreases: Are Analysts Fooled? *Contemporary Accounting Research*, *20*(2), 253–294.

Chen, S., DeFond, M., & Park, C. (2002). Voluntary disclosure of balance sheet information in quarterly earnings announcements. *Journal of Accounting and Economics*, *33*(2), 229–251.

Choi, Y., Lin, S., Walker, M., & Young, S. (2005). Voluntary Disclosure of Adjusted Earnings Per Share Numbers. *Unpublished Working Paper*, University of Lancaster.

Choi, Y., Lin, S., Walker, M., & Young, S. (2007). Disagreement over the persistence of earnings components: evidence on the properties of management—Specific adjustments to GAAP earnings voluntary. *Review of Accounting Studies*, *12*(4), 595–622.

Clarkson, P. M., Koa, J. L., & Richardson, G. D. (1994). The inclusion of forecasts in the MD&A section of annual reports: A voluntary disclosure perspective. *Contemporary Accounting Research*, *11*(1), 423–450.

Clatworthy, M. A., Makepeace, G. H., & Peel, M. J. (2009). Selection bias and the Big Four premium: New evidence using Heckman and matching models. *Accounting and Business Research*, *39*(2), 139–166.

Conyon, M., Core, J., & Guay, W. (2011). Are US CEOs paid more than UK CEOs? *Review of Financial Studies*, *24*(2), 402–438.

Dey, A. (2008). Corporate governance and agency conflicts. *Journal of Accounting Research*, *46*(5), 1143–1181.

Doyle, J., Lundholm, R., & Soliman, M. (2003). The predictive value of expenses excluded from "pro forma" earnings. *Review of Accounting Studies*, *8*(2–3), 145–174.

Francis, J., & Smith, A. (1995). Agency costs and innovation: Some empirical evidence. *Journal of Accounting and Economics*, *19*(2–3), 393–409.

Gaver, J. J., & Gaver, K. M. (1998). The relation between nonrecurring accounting transactions and CEO cash compensation. *The Accounting Review*, *73*, 235–253.

Gjesdal, F. (1981). Accounting for stewardship. *Journal of Accounting Research*, *19*(1), 208–231.

Greene, W. H. (1998). Gender economics courses in liberal arts colleges: Further results. *The Journal of Economic Education*, *29*(4), 291–300.

Heckman, J., Ichimura, H., & Todd, P. (1997). Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme. *Review of Economic Studies*, *64*(4), 605–654.

Holmström, B. (1979). Moral hazard and observability. *Bell Journal of Economics*, *10*(1), 74–91.

Holthausen, R. W., & Watts, R. L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting and Economics*, *31*(1–3), 3–75.

Huang, R., Marquardt, C., & Zhang, B. (2010). Why Do Managers Avoid EPS Dilution? *Johnson School Research Paper Series No. 03-2011* available on the internet at http://ssrn.com/abstract=1464496. Accessed 15.09.10

Iatridis, G. (2008). Accounting disclosures and firms' financial attributes: Evidence from the UK stock market. *International Review of Financial Analysis*, *17*, 219–241.

Iatridis, G. (2011). Accounting disclosures, accounting quality and conditional and unconditional conservatism. *International Review of Financial Analysis*, *20*, 88–102.

Imbens, G. (2004). Nonparametric estimation of average treatment effects under exogeneity: A review. *The Review of Economics and Statistics*, *86*(1), 4–29.

Jensen, M., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Jensen, M. C., & Murphy, K. J. (1990). Performance pay and top management incentives. *Journal of Political Economy*, *98*(2), 225–264.

Jensen, M., & Murphy, K. J. (2004). Remuneration: Where we've been, how we got to here, what are the problems, and how to fix them (ECGI Working Paper Series in Finance No. 44/2004). available on the internet at http://ssrn.com/abstract=561305. Accessed 24.07.09

Jensen, M., Murphy, K. J., & Wruck, E. G. (2004). Remuneration: Where We've Been, How We Got to Here, What are the Problems, and How to Fix Them. *Finance Working Paper No 004/2004. Harvard NOM Working Paper No. 04-28; ECGI - Finance Working Paper No. 44/2004* Available at SSRN: http://ssrn.com/abstract=561305 or http://dx.doi.org/10.2139/ssrn.561305. Accessed 15.01.2012

Kennedy, P. (1992). *A Guide to Econometrics.* Oxford: Blackwell.

Klassen, K. (1997). The impact of insider ownership concentration on the trade-off between financial and tax reporting. *The Accounting Review*, *72*(3), 455–474.

Kuang, Y. F., & Qin, B. (2009). Performance-vested stock options and interest alignment. *The British Accounting Review*, *41*(1), 46–61.

Lambert, R. A. (1983). Long-term contracts and moral hazard. *Bell Journal of Economics*, *14*(2), 441–452.

Lambert, R. A. (2001). Contracting theories and accounting. *Journal of Accounting and Economics*, *32*(1–3), 3–87.

Lambert, R. A., & Larcker, D. F. (1987). An analysis of the use of accounting and market measures of performance in executive compensation contracts. *Journal of Accounting Research*, *25*, 85–125 (Supplement).

Lang, M., & Lundholm, R. (1993). Cross-sectional determinants of analyst ratings of corporate disclosure. *Journal of Accounting Research*, *31*(2), 246–271.

Lang, M., & Lundholm, R. (1996). Corporate disclosure policy and analyst behaviour. *The Accounting Review*, *71*(4), 467–492.

Lougee, B., & Marquardt, C. (2004). Earnings quality and strategic disclosure: An empirical examination of 'pro forma' earnings. *The Accounting Review*, *79*(3), 769–795.

Matsumoto, D. A. (2002). Management's incentives to avoid negative earnings surprises. *The Accounting Review*, *77*(3), 483–514.

Nagar, V., Nanda, D., & Wysocki, P. D. (2003). Discretionary disclosure and stock-based incentives. *Journal of Accounting and Economics*, *34*(1–3), 283–309.

Pass, C. (2006). The revised Combined Code and corporate governance: An empirical survey of 50 large UK companies. *Managerial Law*, *48*(5), 467–478.

Rosenbaum, P. R. (2002). *Observational Studies* (2nd ed.). New York: Springer.

Shanks Group plc (2003). Annual Report and Accounts 2003. available on the internet at http://www.shanksplc.co.uk/~/media/Files/S/Shanks-PLC/Attachments/pdf/reports/archive/ar03.pdf Accessed 12.04.07

Sloan, R. G. (1993). Accounting earnings and top executive compensation. *Journal of Accounting and Economics*, *16*(1–3), 55–110.

Smith, J. A., & Todd, P. E. (2005). Does matching overcome LaLonde's critique of nonexperimental estimators? *Journal of Econometrics*, *125*(1–2), 305–353.

Spectris plc (2003). Annual Report and Accounts 2003. available on the internet at http://www.spectris.com/uploads/2003reportandaccounts.pdf Accessed 12.04.07

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, *5*, 179–194.

Voulgaris, G., Stathopoulos, K., & Walker, M. (2011). IFRS and the Use of Accounting-Based Performance Measures in Executive Pay. Available at SSRN: http://ssrn.com/abstract=1883249

Walker, M., & Louvari, E. (2003). The determinants of voluntary disclosure of adjusted earnings per share measures by UK quoted companies. *Accounting and Business Research*, *33*(4), 295–309.

Young, S., & Yang, J. (2011). Stock repurchases and executive compensation design: The role of earnings per share performance conditions. *The Accounting Review*, *86*(2), 703–733.